DIVERSE QUARTZ FROM THE BELORECHENSKOYE DEPOSIT, NORTH CAUCASUS, RUSSIA

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All specimens: Lyubov V. Badyanova, Belorechenskoye baryte deposit, North Caucasus, Republic of Adygea, Russia.

The Belorechenskoye baryte deposit is renowned among mineralogists and collectors. Situated in the North Caucasus in the Republic of Adygea, it is located approximately 60 km south of Maykop and 8 km south of the village of Dakhovskaya. The deposit was discovered through adits in the headwaters of one of the right tributaries of the Belaya River, specifically the Syuk River, about 6 km from the village of Nikel.

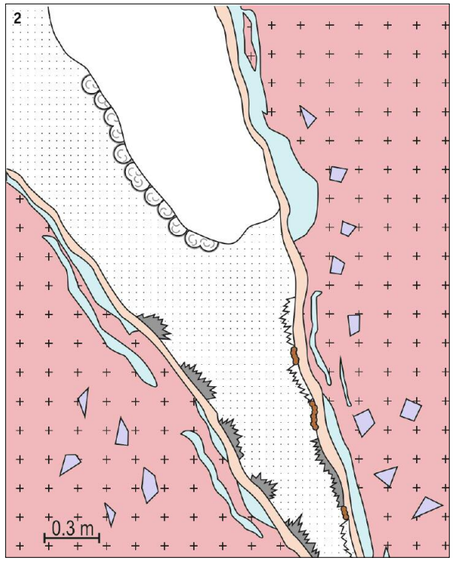
A comprehensive overview of the Belorechenskoye mineralogy and geology is given in Pekov *et al.* (2010).

Collectors are particularly fond of the honey-yellow fluorite, gray calcite with finely dispersed marcasite inclusions, and galena especially the twins that follow the fluorite law. However, it is the baryte from the Belorechenskoye deposit that stands out, with its diverse yet recognizable samples serving as a "calling card" of the location.

Notable specimens are large spherulites adorned with pyrite and chalcopyrite crystals, sheaf- and comb-like aggregates, feather-like crystals, transparent prismatic crystals (some of optical quality), as well as striking white baryte "flowers" and "hedgehogs."

While quartz has been mentioned in various studies concerning the Belorechenskoye deposit, it has not received the same level of attention as baryte and other vein minerals. Quartz does not form separate large veins at the deposit, but it is not a mineral of low abundance either.

1. Aggregates of **quartz** of orange-rust color on the rock. The width of the field of view is 40 cm. Adit No. 2, Belorechenskoye deposit, North Caucasus, Russia. Photo: Lyubov V. Badyanova. June 2022.



2. Schematic sketch of the cavity with aggregates of lamellar quartz. Author of the sketch: Lyubov V. Badyanova.

Legend:

- granite gneiss;
- light pink veins of dolomite;
- carbonate-clay interlayer;
- calcite crystals;
- white vein baryte;
- quartz nodules with calcite crystals;
- galena;
- aggregates of lamellar quartz;
- fragments of silicified rocks

The quartz described in this paper was sampled by the author from the upper adits above the Syuk River. Additionally, we examined rock crystal specimens from the collections of Victor A. Sletov and Mikhail M. Moiseev, as well as samples deposited in the Fersman Mineralogical Museum of the Russian Academy of Sciences. These specimens were acquired in the years 1974 (from Victor A. Sletov), 1988 (from Dmitriy A. Romanov), 1990 (from A.V. Gribanov), and 2002 (from the collection of Victor I. Stepanov).

In June 2022, a cavity was discovered in granite gneiss, where one wall was coated with orange-red aggregates of an unidentified mineral (*Fig.* 1).

The cavity, situated within the inflation zone, is irregularly shaped and tapers downward, with dimensions reaching approximately 3 x 1.6 m (*Fig.* 2). The surrounding granite gneiss is frequently silicified, and in certain areas, fragments of dolomite and baryte veins are present, rimed by quartz.

The host rock is cut by dolomite veins ranging from 4 to 8 cm in thickness. The wall zone consists of dense aggregates of pink dolomite, which gradually transits to white hexagonal dolomite towards the axial part. The grayish brown coloration observed on the surfaces of dolomite crystals is caused by a thin sulfide crust.

In the wall zone of the veins, a densely cemented carbonate-clay interlayer of grayish-green color is between the dolomite and the host rock. Microfractures within this interlayer are filled by supergene minerals, including white gypsum crystals and pink cobalt-bearing annabergite. The dimensions of the cobalt-bearing annabergite and gypsum crystals reach 2 mm. The carbonate-clay interbed is up to 10 cm thick and follows the contours of the dolomite vein.

Above the dolomite, a crust composed of galena and fluorite with chalcopyrite forms (thickness of up to 4 cm). The fluorite exhibits a range of colors, including yellow, green, colorless, or gray, due to abundant sulfide inclusions. Fluorite crystals do not exceed 5–7 mm in size.

Crystals of gray calcite, the latest mineral here, adorn the walls of the cavity, reaching 12 cm in size. The surfaces of these calcite crystals are coated with supergene sulfates and carbonates of copper and zinc, as well as a black bituminous matter (*Fig.* 3).

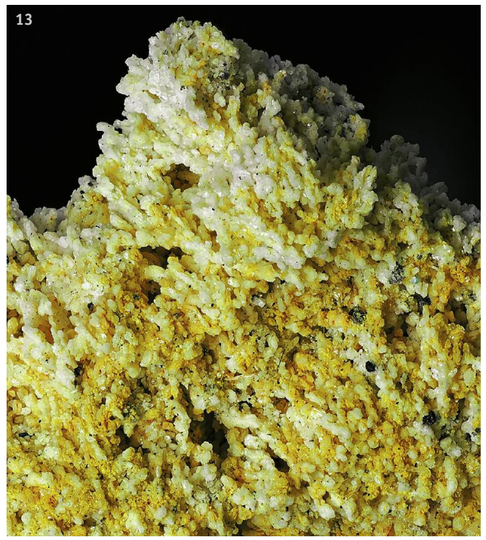
At the top of the cavity, a part of the baryte vein is exposed. At its contact with the granite gneiss, the baryte is granular and pinkish

11. Bunches and spherulite-like aggregates of lamellar **quartz** colored by secondary minerals of **copper** and **iron**. The width of the field of view is 10 cm.

Photo 11-17: Lyubov V. Badyanova.

12. Iron hydroxide-stained and white unstained aggregates of lamellar **quartz**. Width of the field of view 2 cm.

13. Crusts of bright yellow **biverite-(Cu)** on **quartz**. Width of field of view 2.5 cm.



with beaverite-(Cu) (*Figs*. 11, 12, and 13). Beaverite-(Cu) is identified based on its qualitative chemical composition (Fe:Cu ratio of 2:1) and distinct crystal morphology. The orange-red color is caused by limonite films.

Dendrite-like Aggregates and Nodules

At the Belorechenskoye deposit, a more common feature is the so-called quartz "dried grains" aggregates composed of corroded quartz grains with slightly dissolved surface. Although these aggregates are somewhat similar to the aforementioned quartz "rosettes," they are generally larger, reaching 20 cm in size, and are exclusively spherical in shape occurred as nodules or hemispherulites (*Fig*. 14). Their color is beige, cream, or reddish hues.

Quartz grains are frequently rimed or coated by crusts of chalcedony quartz.

Large quartz nodules, along with the described above aggregates of lamellar quartz, are often coated with green crusts of malachite and brochantite, as well as fine crystalline yellow beaverite-(Cu), orange limonite, and light blue serpierite.

The specimens featuring dendrite-like branching quartz and gray calcite crystals are equally stunning (*Fig*. 15). The calcite crystals exhibit a distinctive pattern reminiscent of the "frost patterns" seen on windows during winter. This effect is caused the decomposition of marcasite or pyrite due to the influence of surface water, leading to the formation of films and thin skeletal crystals of gypsum (*Figs*. 16, 17, and 18).

14. **Quartz** "drier" – aggregate formed by quartz with traces of co-growth with **baryte**. Nodules shape retained after baryte dissolution. 12 x 10 cm.

15. Dendrite-like aggregates of lamellar **quartz**. The width of the field of view 4 cm.

16. Dendrites of **gypsum** on a **calcite** crystal. The width of the field of view 2.4 cm.

17. **Gypsum** forming a "frost pattern" on **calcite** crystals.
The width of the field of view 4 cm.